

announcing **THE INSIDER™!**

A 10 Mega-byte Internal Hard Disk Drive System...

Only **\$995**



Expand your IBM* PC so that it performs like the PC XT for a fraction of the cost.

Micro Design International announces a major breakthrough in peripheral technology — The Insider™! It is the only hard disk drive system to offer you 10 Mega-bytes of formatted capacity with complete internal installation, all for \$995. Now you can expand your IBM* PC to handle heavyweight data with the same ease and efficiency as the PC XT. By equipping your PC with The Insider™ you can save up to \$2,000 over the cost of a PC XT. It's the perfect solution to your data needs *and* budget.

The Insider's™ engineering is far superior to any other hard disk drive system on the market. Unlike other internal drives which require an external power supply, The Insider™ uses available power. In fact, it uses only 0.9 A of direct current thereby eliminating overheating, a problem which has plagued other drives. Our drive and electronics are so good that we carry a full one year warranty.

The Insider's™ low price of \$995 includes complete software with all needed utilities; a Sandstar™ Hard Disk Controller Card which has expansion slots for other SandStar™ Modules; complete cables and simple instructions for easy installation.

The Insider is also compatible with most IBM PC look alikes.

To expand your PC to the performance of a PC XT at a fraction of the cost, **CALL TODAY** to order The Insider™. MasterCard and Visa are accepted; or, send check or money order to Micro Design International.

**TO ORDER
CALL COLLECT 305/788-3475**

Micro Design International, Inc.

Suite 375
100 Sybelia Ave.
Maitland, Florida 32751

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** Sandstar™ is a registered trademark of Maynard Electronics.

THE INSIDER 12.8 MB WINCHESTER DISK DRIVE, CONTROLLER & MULTI-FUNCTION CARD SPECIFICATIONS

□ CONTROLLER FEATURES

- Winchester Controller with expansions port to accommodate any combination of 3 of the following modules -clock module; serial interface; parallel interface; game interface; or can accommodate a memory board or floppy controller and still only take up one slot in the P.C. chassis.
- Buffered seek mode speeds access time
- Memory Board combinations up to 576K
- Single +5V Power Supply
- 8 bit universal I/O port to host
- Controls for two 5.25" Winchester Drives
- Data separation circuitry contained on board
- Write Precompensation
- Sector Buffer on board supports up to 1K byte sectors
- Programmable sector sizes - 128, 256, 512, or 1024 bytes
- Automatic track formatting
- Multiple sector operations on all disks
- Data rates up to 5 Mbits/sec on hard disk
- Error Correction of a single burst up to 5 bits on hard disk data
- CRC Generation/Verification for data and all I.D. fields
- Automatic retries on all errors
- ECC Diagnostic commands included (READLONG & WRITELONG)
- Power-on diagnostics / TEST command included
- 16 different stepping rates available

□ DISK DRIVE FEATURES

GENERAL DESCRIPTION

The Micro-Design International Incorporated 5 1/4-inch Half Height HH-612 Winchester Disk Drive is a random access storage unit.

The HH-612 consists of a sealed Head/Disk assembly, thermally isolated brushless DC spindle motor, recirculating sealed air and filter, thermally isolated stepper motor and 3 separate electronic PCB's.

The standard interface supplied with the HH-612 Series is a Seagate ST506 "type" that features a "Buffered Seek Mode" for optimum access times.

The HH-612 Series Drive mounts in an industry-standard half height mini-floppy (5 1/4") chassis and requires the same DC voltages and connector. No AC voltage is required.

Industry-leading features include:

- Closed loop servo positioning with stepper motor in microstepping mode.
- Storage capacities of 12.76 megabytes unformatted.
- Proven Winchester Technology.
- Thin film media is rugged.
- Stainless steel band-driven actuator/stepper motor head positioning system with linear actuator.
- High efficiency internal filtration system.
- Full step positioner for increased on-track accuracy.
- Precision microprocessor-controlled brushless DC spindle motor.
- "Buffered Seek Mode" for reduced access times.
- Shock-mounted to reduce vibration.
- Internal microprocessor performs constant drive checks during operation.
- 5.0 Megabit-per second data transfer rate.
- Inner and outer guardbands are used for crash-free operations.

Mechanical Features

- Unique, rugged and elegant mechanical design that can endure abuse.

- Half - Height.
- Single disk, plated media.
- 2 heads per surface.
- Shock mounts reduce vibration.
- Sealed for protection and reduced error rates.
- Simplicity of assembly and disassembly.
- The electronics can be disassembled while the main boards are attached via 2 ribbon cable extenders. The drive will continue to function without any deterioration.

Electronic Features

- Servo system is used to provide perfect tracking ± 50 micro inches.
- Self diagnostics will indicate that the drive is mechanically deteriorating while still performing, giving the user sufficient time to back up the data and the drive.
- Design of the read/write channel, in spite of obvious economic and space limitations, enables the HH-612 to achieve the quality of large disk drives.

Features include:

- A) Automatic Gain Control.
- B) Differential Tracking Threshold.
- C) ECL processing circuitry.
- D) Ability to process recorded signals in any coding configuration.

Specifications

Capacity	Per Drive	12.76 MBytes
Unformatted	Per Surface	6.38 MBytes
	Per Track	10416 Bytes
Formatted	Per Drive	10.0 MBytes
	Per Surface	5.0 MBytes
	Per Track	8192 Bytes
	Per Sector	256 Bytes
	Sectors Per Track	32
Data Transfer Rate		5.0 MBytes/Sec.
Average Latency		8.45 Msec.
Access Time	Track to Track	3 Msec.
	Average	55 Msec.
	Maximum	135 Msec.
	Settling Time	45 Msec.
Functional Specification	Rotational Speed	3550 rpm $\pm 0.2\%$
	Recording Density	9680 bpi
	Flux Density	9680 fci
	Track Density	648 tpi
	Cylinders	612 (306 per head)
	R/W Tracks	1224
	Discs	1
	Index	1
	Heads	4
Interface		Industry Standards for 5.25" Fixed Disk Drive both for Control and Read/Write.
Reliability Specifications	MTBF (typical usage)	11000 poh
	Preventive Maintenance	None
	Component Life	5 Years
	MTTR	30 Min.
	Error Rates	
	Soft Read Errors	1 in 10_{10} bits read
	Hard Read Errors	1 in 10_{12} bits read
	Seek Errors	1 in 10_6 seeks
Power Requirements	DC Voltage	+ 12 volts $\pm 5\%$ @ .9 A typ/1.8 A start + 5 volts $\pm 5\%$ @ .9 Amps.
	AC Voltage	Not Required
	Power Dissipation	16 Watts (50 BTU/Hr)
Environmental Limits (Operating)	Ambient Temperature	40° to 122°F (5° to 50°C)
	Relative Humidity	8 to 80%
	Wet Bulb, Maximum	78°F, Non-Condensing

PERIPHERALS AVAILABLE WITH THE INSIDER

• Memory Card

The amazing flexibility of the SandStar™ Memory Card allows you to expand your total system memory from 64k bytes all the way up to 640k bytes using only one card slot. In addition, up to three other SandStar™ Modules can be added at any time.

Memory can be easily expanded in 64k byte increments up to 576k bytes. Beyond 256k bytes of memory, an additional 320k bytes can be added by using the SandStar™ Memory Module. SandStar™ Memory cards are engineered for total compatibility with IBM I/O specifications and include parity generation and detection. Also available are electronic disc and print spooling software.

Technical Data

Utilizes 200 ns memory chips with no wait states added to the system. Parity generation and checking are per IBM specifications. Utilizes IBM main board refresh scheme. Each 64k bank can be located on any 64k boundary between 64k and 640k or between 768k and 960k within the system address space. Memory can be split up or assigned contiguously. Board accepts any of the SandStar™ Modules, the bus for modules is buffered from the Personal Computer I/O bus.

• Memory Module

The SandStar™ Memory Module was created for use with Memory Card described above. With the Memory Module the 256k byte Memory Card can be expanded by 320k bytes for a total of 576k bytes of system memory while using only one IBM expansion slot. The Module comes ready to plug into the SandStar Memory Card with no configuration required.

Memory bank addresses are jumper selectable so that each 64k bank can be located on any 64k boundary between 320k and 640k or between 768k and 960k.

• Multifunction Card

The SandStar™ Multifunction Card gives you complete flexibility. The module locations on the card allow you to configure your system with as many as six SandStar™ Modules. As new functions become available, the SandStar™ Multifunction Card is ready to adapt to your needs. As with all SandStar™ Series Cards, all modules function independently.

• 5¼" & 8" Floppy Drive Controller Card

The SandStar™ 5¼" Floppy Drive Controller is 100% compatible with the IBM® Personal Computer and will accept up to three SandStar™ Modules. It can control two floppy drives mounted inside your Personal Computer and optionally two additional drives mounted internally or externally.

The software interface for the SandStar™ Floppy Drive Controllers is identical to IBM's Diskette Drive Controller. The drive controller is provided completely equipped to mount and connect. Complete instructions are provided and installation is easy.

Cable connections between the controller and two internal floppy drive(s) are included.

Technical Data

The SandStar™ 5¼" Controller Card controls up to four one- or two-headed floppy disc drives utilizing MFM encoded data. It incorporates the NEC UPD765A or equivalent controller chip and the Western Digital phased lock loop data separator. With appropriate software, 80 track drives can be controlled. Data transfers are via the system board DMA.

The SandStar™ 5¼" Floppy Drive Controller supports the computer write-protect feature and supplies write compensation of 250ns (per most drive manufacturers' specifications). All software interfacing specs comply with the IBM Technical Reference Manual specifications.

• Serial Port Module

The SandStar™ Serial Port Module's design makes it totally

compatible with software written for the IBM Asynchronous Adaptor. It can be used to connect to a MODEM, serial printer or any device using a standard RS232-C interface. The port may be configured as Serial Port #1 or #2. You can also use IBM diagnostics.

Technical Data

The SandStar™ Serial Port features programmable baud rate, character length, parity bit generation and detection. It uses the INS8250-B or equivalent chip for complete compatibility and can be configured for addresses from 3F8h to 3FFh or 2F8h to 2FFh (COM1: or COM2:). Module comes with cable using a standard 25 pin "D" subminiature connectors which can be mounted on a modular bracket.

• Parallel Port Module

The SandStar™ Parallel Port Module is a Centronics™ compatible I/O port which can be connected to a printer or used as a general purpose I/O port. The port utilizes the same type of connector and pins as the IBM Parallel Printer Adaptor and is 100% compatible with software written for it. The port may be configured as Port #1 or #2. IBM diagnostics will run on this module.

Technical Data

The Module utilizes nine control and eight I/O data lines. All signals are of the buffered TTL level type. May be configured to recognize addresses 378H-37AH or 278H-27AH (LPT1: or LPT2:). Module comes with cable using a 25-pin "D" subminiature type connector which can be mounted on a modular bracket (available from Maynard Electronics) or connected directly to the outside equipment cable.

• Clock Calendar Module

The SandStar™ Clock Calendar Module features a clock and calendar with battery back-up which runs even when the IBM PC power is turned off or the unit is unplugged. The correct time and date is automatically loaded each time the system is powered up so that the user can determine chronological order of file creation. Software is included.

Technical Data

The SandStar™ Clock Calendar Module is a battery supported CMOS clock calendar chip accessed on the I/O bus using addresses 280H to 28FH. The OKI chip contains time, date and year. No extra CMOS RAM is required thereby lengthening battery life. The battery is inexpensive and available anywhere watch batteries are sold.

• Game Adaptor Module

Playing your favorite games on your IBM Personal Computer is now easier than ever with the SandStar™ Game Adaptor Module. Up to four paddles or two joysticks can be attached. In addition, the Module can be used for general purpose input with four digital inputs and four analog inputs.

This module is 100% compatible with software written for the PC and uses the same type 15 pin "D" subminiature I/O connector as the IBM Game Control Adaptor.

Technical Data

The SandStar™ Game Adaptor Module uses I/O addresses 200H to 20FH. The module has four digital inputs for "trigger" buttons which go to a logical low when grounded. Also, there are four inputs for connecting 100k ohm potentiometers to the module. The circuitry on the module converts the resistance to a digital pulse the length of which is directly proportional to the resistance.

• XT-Rom

Sandstar has made a true break thru that will allow the P.C. to boot from the Insider Harddisk exactly like the XT -There is no need to have a Floppy Diskett installed. (works on newer P.C. with 256K socketed main board only.)

ORDER FORM

Check box for items desired.

Total cost of all items add ~~\$4.40~~ ^{13.50} shipping and handling. Florida Residents add 5% state sales tax.

MODEL	PRICE
<input type="checkbox"/> IS01 Insider Winchester System w/Multifunction Card as described (three vacant module slots)	\$ 995.00
<input type="checkbox"/> IS02 Insider Winchester System and Floppy Disk Controller (no vacant modules slots) . . .	1,295.00
<input type="checkbox"/> IS03 Insider Winchester System w/RAM Memory Card that will hold upto 256K RAM (no RAM installed) (no vacant module slots)	1,295.00
<input type="checkbox"/> IS04 Expansion Memory Module for Model IS03 above to allows 320k additional RAM for a total of 576k (Module Only no RAM installed)	129.00
<input type="checkbox"/> IS05 Per 64k of RAM for IS03 & IS04 above.	75.00
<input type="checkbox"/> IS06 Multi-function cards with 6 vacant slots	88.00

MODULES FOR USE WITH IS01 and IS06 above.

<input type="checkbox"/> IS07 Parallel Port Module (Centronics compatable)	59.00
<input type="checkbox"/> IS08 Serial Port Module (RS 232)	95.00
<input type="checkbox"/> IS09 Clock Calendar Module w/battery	65.00
<input type="checkbox"/> IS10 Game Adaptor Module	55.00
<input type="checkbox"/> IS11 Hard Disk Controller Module includes software requires 3 slots	395.99
<input type="checkbox"/> IS12 XT-ROM	48.00

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CREDIT CARD NUMBER _____ EXPIRATION DATE _____

Total Amount of Order \$ _____ from list above. Add ~~\$4.40~~ ^{13.50} shipping. Florida residents add 5% state sales tax.

Mail to: Micro Design International, Inc.
Suite 375
100 Sybella Ave.
Maitland, Florida 32751

PHONE ORDERS CALL COLLECT
305/788-3475

SIGNATURE _____